

Assessment of Socio-Economic Impact of Taungya System in Oluwa Forest Reserve, Ondo State, Nigeria

Adeoye, I.A.*, Agbeja, B.O. and Ajewole, O.I.

Department of Forest Resources Management, University of Ibadan, Nigeria. * Corresponding author, Email: adeoye03@gmail.com

ABSTRACT

Nigeria has experienced a remarkable degradation and depletion of its forest resources over the years. This process has undermined the socio-economic and socio-cultural importance of the forests for millions of rural people who depend on the resource to support their livelihood. This has exacerbated landlessness, land conflict and rural poverty. Meanwhile the government of Ondo State in its effort to manage the menace introduced taungya plantation system adopted as a strategy to sustainable livelihood. The study was therefore undertaken to assess the socio-economic impact of the taungya system on livelihood of the rural economy in Ondo State, Nigeria. Survey of 268 randomly selected farmers in five villages in and around Oluwa forest reserve, Ondo State, Nigeria confirmed that large percentage of the farmers were illiterate, within the age bracket of 41-50. A statistically significant difference was detected in income from taungya and non-taungya farming practices. However, about 3.73 percent of non-taungya farmers are not aware of the taungya system and 38.81 percent not being interested while 35.07 percent were satisfied with their current farming practice. The results showed that taungya farming system is mostly influenced by income level and farm size of the farmers and that they made gains in food crops yields and income generation, which reduced poverty considerably as compared with non-taungya farmers. Institutions which promote rural development and awareness of taungya system should incorporate the system into development agenda to enable rural households improve upon their livelihood and know-how of the system.

Keywords:

INTRODUCTION

From time immemorial, forests have played key roles in global, national and local economies especially in sharpening the socio-cultural life of people and quality of the environment. Nigeria covers a land area of about 983,213 km² of which one-third is classified as forest (Ogunlade 1993). However due to shortage of land and increasing population pressure, shorter fallow periods like agroforestry are being adopted by farmers, reducing the efficiency and sustainability of this practice (Oke 2002). Meanwhile economic considerations are among the most important factors that determine the value and feasibility of agroforestry to the land user (Nair, 1993). The system is an aspect of farm forestry that encourages a deliberate integration of woody perennials (trees, shrubs, palms, bamboos among others) with agricultural crops and/or animals on the same land management unit in form of spatial arrangement or time with the aim of enhancing soil fertility and increasing farmers' income with the use of economic trees (Akinbile *et al.*, 2007). An example of this integration system is the taungya farming system, thus, some economic benefits associated with taungya system include provision of fuelwood, non-timber forest products (NTFPs), generation of household income, plantation establishment etc.

Taungya provides Non Timber Forest Products (NTFP's) to farmers comprise of a wide range of products such as fruits, seeds, roots, chewing gum, resin, medicinal plants, honey, bush meat, including birds (Okafor, 1994). The system aids plantation establishment with low labour input due to the fact that taungya farmers provide free labour services for site

preparation and planting operation (Ball, 1977). Therefore, it minimizes cost at one hand and increases profit on the other hand. It creates employment for the people who are opportune to farm in the plots.

More so, the system provides raw materials for many types of industries such as pulp and paper industry, furniture industry as well as poles of tree of certain species of *Tectona grandis* used as poles for electricity transmission (FORMECU 1999). Teak (*Tectona grandis*) timber is of high value, and the species is easily established in plantations. This makes teak one of the most promising species for plantations in the tropics, although the soil requirement is rather specific (Keogh, 1996). Teak is an obvious choice for intensive domestication activities, because it is used on a large scale in many countries and the timber has a high value with stem quality being important (Kjaer and Foster, 1995; Kaosa-ard, 1996). Additionally, taungya system increases farmers' income because of low cost of factor input due to no cost and no fertilizer application in the system (Adesiyan, *et al.*, 2007). This also reflects on cost of weeding which is often low in taungya farms. Thus taungya like most of agroforestry practices is geared towards making some profits for both farmers and forestry department. This is because profit is the major incentive in any enterprise (Popoola, 1998).

Currently, this practice is very limited in Nigeria (Babalola, 2009). Taungya system was probably the oldest method of community participation in forest management, introduced by Richard St. Barber Baker in 1926 (Bada, 1999), but it appears that most of these practices are not being used in most of the protected areas in Nigeria. The study therefore assessed the

socio-economic impact of taungya system in Oluwa Forest Reserve with a view to determine the benefits accruable to the farmers and the influence of the system to the general activities of the communities on existing and proposed project for sustainable development from the system.

METHODOLOGY

Study Area

The study was conducted in Oluwa Forest Reserve in Odigbo Local Government Area of Ondo State where taungya system practice is consistent. The reserve is located between latitude 6° 49' and 6.823° N and longitude 4° 40' and 4.674° E. Five communities were randomly selected namely Makinde, Abatuntun, Omotesho, Ayetoro and Kajola. Most rivers and streams draining this forest rise from the northern part of the forest. Notably among the rivers are Oni, Oluwa and Ominla. The raining season is from December till February. Annual rainfall ranges from 1700 to 2200mm and annual mean temperature in the forest is 26°C.

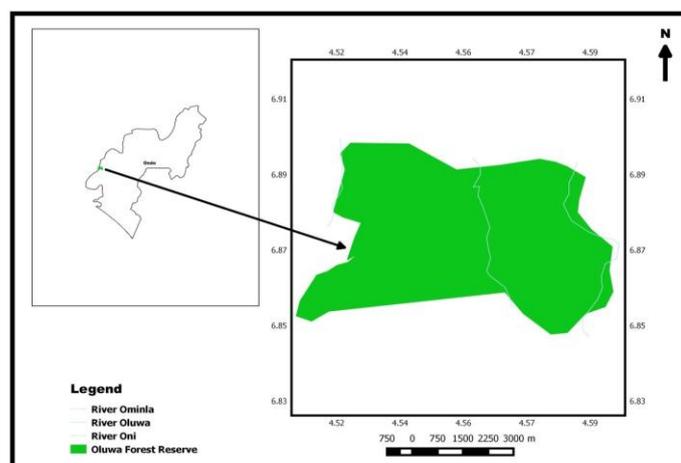


Fig 1: Map of Ondo State showing the location of Oluwa Forest Reserve.

Methods of Data Collection

$$W_i = \alpha_0 + \alpha_1 Sp + \alpha_2 H + \epsilon \dots\dots\dots(1)$$

Where;

W_i = Taungya Participation Status (Taungya farming household = 1, Non-taungya farming household = 0).

Sp = Access to enough forest land for taungya (Access =1, No Access =0)

H = Socioeconomic and household Characteristics

ε = Random error term

The Variables included in the model are:

X1 = access to forest land for taungya (1= access, 0 = no access), X2 = household size (number), X3 = annual household income (naira), X4 = educational level of household head (years), X5 = Gender of Household head (1, if male and 0, if female) X6 = Farming experience of household head, X7 = Age of household head (years), X8 = Farm size, e = error term, α = constant

RESULTS AND DISCUSSION

Socio-economic Characteristics of taungya and non-taungya farmers

A summary of the socioeconomic characteristics of the respondents is given in table 1. The average age of taungya farmers is 47.51 while that of non taungya farmers is 47.34.

Some visits were made to Ondo State Ministry of Environment and Natural Resources to obtain basic data on allocation of taungya farms. Information concerning communities practicing taungya system and the farmers involved in taungya plantation practice in the reserved land were obtained from the state Forestry Department. A field survey was undertaken in these communities to collect primary data. The respondents were both taungya and non-taungya practicing farmers in the forest reserve. The number of sampled were based on 30, 20 and 5% sampling intensities on population of less than 100, between 200 and 100 and more than 200 respectively in accordance with Boyd et al., (1981) cited by Kajembe and Luoga (1996) who argued that a significant representation of a population is achieved when a random sample of 5% is taken for the study. However, according to Akitanda (1994), a minimum size of sampled unit for a population ought to be not less than 30 for each sampling category.

Methods of Data Analysis

Data for this study were collected by primary data from the farmers and the secondary data from Ondo State Ministry of Environment and Natural Resources. The primary data were obtained with the use of well-structured questionnaires. The questionnaires were used to elicit information from the respondents. Personal interviews were carried out using field assistants who made use of local languages such as Ikale and Yoruba. Thus, a total of 282 copies of questionnaire were administered to all the locations considered in this study, while 268 questionnaires were used for the analysis. Data collected were analyzed using descriptive statistic such as simple percentages; frequencies means and standard deviation this was used to explain the demographic and socio-economic characteristics of the respondents. Logistic regression model was used to assess the factors that influence participation of taungya plantation system in the study area. The Logistic Regression model in its implicit form was stated as:

is an indication that women are either less interested in farming activities or had other more primary occupation.

Table 1: Summary of Socioeconomic Characteristics of Taungya and Non-taungya Farmers

Characteristics	Taungya Farmers (N=134)	Non-Taungya Farmers (N=134)	Pooled (N=268)
Average Age Household Head	47.51	47.34	47.43
Average Household Size	5	5	5
Educational Level of Household Head			
% of No Formal Education	68.66	72.39	70.52
% of Primary Education	24.62		
% of Secondary Education	4.48	5.97	5.22
% of Tertiary Education	2.24	0	1.12
Proportion of Male Farmers (%)	87.31	89.55	88.43
Proportion of Female Farmers (%)	12.69	10.45	11.57
Average Household Farming experience (years)	15	14	15
Households with Agriculture as Primary Activity (%)	93.28	88.06	90.67
Households with Agriculture as Secondary Activity (%)	6.72	8.96	7.84
Proportion of Natives (%)	50	51.49	50.75
Proportion of Settler(%)	50	48.51	49.25
Average Farm Size (ha)	1.15	0.8	0.93

Level of Awareness of Taungya Farming System

Awareness of taungya farming system could influence the participation by a farmer. This is because most times participation by a farmer may require that the farmer have prior knowledge of the benefits of the system. The distribution of respondent with respect to their level of awareness of taungya farming system is given in table 2. As shown in table 2 and fig 2, the result showed that 98 percent from both the taungya farmers and non-taungya farmers was

aware of taungya farming system, in which case 96 percent of the non-taungya farmers are aware of the taungya farming system while 3 percent are not aware of the system. Interestingly, 32 percent of taungya farmers got their information from formal sources and 67 percent from informal source whereas 21 percent of non-taungya farmers got their information also from formal source and 78 percent from informal source.

Table 2: Distribution of Respondents by Level of Awareness of Taungya Farming System

Awareness	Taungya Farmers N=134		Non-Taungya Farmers N=134		Pooled N=268	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Yes	134	100	129	96.27	263	98.13
No	0	0	5	3.73	5	1.87
Total	134	100	134	100	268	100
Information Source						
Formal	44	32.83	28	21.71	72	27.38
Informal	90	67.17	101	78.29	191	72.62
Total	134	100	129	100	263	100

Source: Field Survey, 2014.

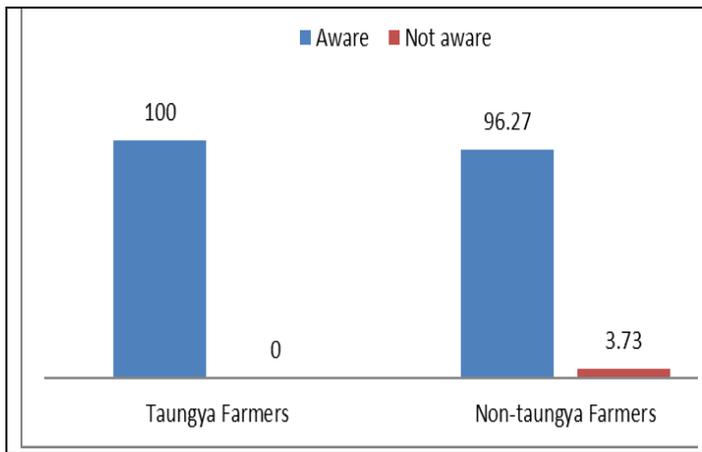


Fig 1: A bar chart showing the level of awareness of taungya system in the community.

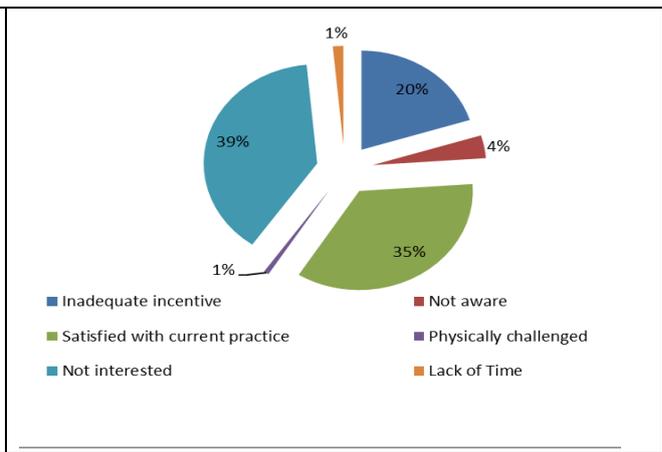


Fig 2: Pie chart showing reasons farmers for not participating in taungya system.

More so, the reason for non-participant of the taungya system irrespective of their awareness is given in table 3. The result shows that 38 percent of the respondents are not interested in taungya farming system; this was closely followed by farmers who are satisfied with their current farming practice with 35

percent. As shown in the table the result also indicated that 20 percent of the respondent feels that the reason why they did not participate is that there is no adequate provision for them while 3 percent were totally not aware of the farming system.

Table 3: Distribution of Respondents' Reason for Non-Participation in Taungya Farming

Reason for Non-Participation	Frequency	Percentage
Inadequate incentive	27	20.15
Not aware	5	3.73
Satisfied with current practice	47	35.07
Physically challenged	1	0.75
Not interested	52	38.81
Lack of Time	2	1.49
Total	134	100

Source: Field Survey, 2014.

Factors influencing Farmers Participation in Taungya System

Table 13 shows the result of the factors influencing participation in taungya system. The logistic regression model

was employed to access the factors influencing participation among the respondents in the study area.

Table 4: Factors that influence participation in taungya teak plantation in the study area

Variables	Coefficient	Standard error	P-values
Constant	-.3354563	.820833	0.0683*
Household Size	-.1631082	.0895239	0.068*
Age	-.0081675	.0146282	0.577
Farming Experience	-.0720623	.0289155	0.013**
Farm Size	2.770717	.4911978	0.000***
Income Level	5.48006	1.87006	0.003***
Gender	-.8509937	.4512025	0.059*
Education Level	-.0536701	.042549	0.207

Source: Field Survey, 2014.***significance at 1%, **significant at 5%, * significance at 10%

The result of the logistic regression model estimate revealed that out of the eight factors hypothesized to influence participation of the households, five variables were statistically significant and found important in explaining the factors of participation of the household. These variables

include farm size and income level which were significant at (p<0.01), meanwhile levels of farmers' experience was significant at (p<0.05), whereas household size and gender of the household were significant at (p<0.1). The remaining two variables, namely, age of the household head and the level of

education of the respondents, were not statistically significant. The discussion and interpretation of the significant explanatory variables in the model are presented as follows.

Farm size

This variable was significant at 1% probability level and has a positive influence on participation of households in taungya system. This meets the A priori expectation. This could be expected since access to forest land serves as relief smoothing mechanism which gives households temporal relief against unavailable forest land for agriculture or land hunger. The result of the study implies that households with large farm size have greater chances of participating compared to those with smaller farm sizes, all things being equal. The value of marginal effects indicates that when a household have access to forest land the probability of that household to participate in the taungya system will be increased by 2.77.

Annual Household Income

This variable has positive influence on taungya system participation of farming households. The variable has the expected sign and is significant at 1% probability level. This indicates the higher the income of households, the greater the probability of being a participant in taungya system. The value of the marginal effect implies that if households' income increase by One naira, the probability of the household participating in the taungya system will be increased by 5.48, holding all other things constant, though negligible. This result is consistent with the report made by Idusuyi (1997) that majority of the farmers in Agroforestry practice use their own money in engaging in the practice. This corroborates the views of Popoola (1998) that agroforestry practice like every other enterprise is carried out in order to make financial profit.

Level of Farming Experience

Level of experience is the number of years of famers in relation to farming activities. The result indicated that level of experience has an influence to farmer's participation in taungya farming system. The variable is significant at 5% probability level. This implies that the higher the level of experience the less likely the farmer participates in taungya

system. The value of marginal effect shows that if there is an increase in the level of years of experience by one, the probability of household participating in taungya system will increase by 0.07.

Household size

The coefficient of household size is positive indicating that respondents with large household size have the tendency of participating in taungya system than respondents with small household size. The variable is significant at 10% probability level. This is linked to the fact that larger household are likely to have more labour to assist in farming activities. This finding is similar to that obtained by Bernard (2010) in his study "contribution of farm forest plantation management to the livelihood strategies of farm households in the high forest zone of Ghana. Additionally, the result is also in line with that obtained by Jenifer (1999) in which household size was found to have a positive effect in establishing forest plantation in rural communities.

Gender of Household Head

Gender of household head is defined in terms of the role played by the individuals in providing households' needs including acquisition of food. The result of the study shows that gender of the household head has positive and significant correlation to farmers' availability to participate. This variable is also significant at 10% probability level. Other variables being constant, having a female as the head of a household decreases the participation factor by -0.85. This result is in line with previous study by MANR (1991); Ogunlade (1993) also had similar results in his study.

Socio-economic Impact of Taungya system on Livelihood of local dependants

Income Distribution

Annual income per hectare of both the taungya and non-taungya farmer is shown in table 5. Income could influence the participation of taungya farming system by a farmer. This is because most times participation by a farmer may require that the farmer incur some cost.

Table 5: Income Distribution of Taungya and Non-Taungya Farmers

Income (Naira)	Taungya Farmers =134		Non-Taungya Farmers N=134		Pooled N=268	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
<100000	0	0	45	33.58	45	16.79
100000-500000	124	92.54	87	64.93	211	78.73
501000-1000000	8	5.97	2	1.49	10	3.73
>1000000	2	1.49	0	0	2	0.75
Total	134	100	134	100	268	100
Minimum	100000		35000		35000	
Mean	251,809.7		156574.6		204192.2	
Max	1,116,000		800000		1116000	
Stddev	164527.5		95709.57		142558.4	

Source: Field Survey, 2014

As shown in table 14, no taungya farmer made less than ₦ 100000 whereas 33 percent of non-taungya farmers made less than that. More so 1 percent of taungya farmers made more than ₦ 1000000 per year whereas there was no indication of non-taungya farmers making up to that per year. However, the average income of taungya farmer is ₦ 251809.7 while for the non-taungya farmers it was ₦ 156574.6. Sources of non-agricultural income include trading, motor cycle transportation, driving, machine operator etc.

Table 6: Programme impact on general activities in the community

Activities	Ranks in Percentage					
	HI	I	N	LI	NI	Total
Reporting Forest Encroachers	0	0.36	0	3.00	96.63	100
Increased Community Participation in Afforestation Programmes	0.37	13.86	8.61	17.98	59.18	100
Increased Social activities	0.37	9.74	0.37	28.09	51.69	100
Migration out of the Village	0	0.36	7.87	8.99	82.78	100
Migration into the Village	6.24	81.88	9.75	1.77	0.36	100
Social amenities	1.12	4.87	12.73	21.35	59.93	100

Source: Field Survey, 2014. HI- Highly Influenced; I- Influenced; N-Neutral; LI-Less Influenced; NI-Not Influenced
As shown in table 6, the discussion and interpretation of the effects are presented as follows.

Migration in and out of the study area

While 9.75 percent claimed migration into the study area as a result of the taungya system is neutral, 7.87 percent feels that migration outside the communities is in neutral state. As shown in the table, 81 percent claimed that the taungya system has positive effect on the influx of migrant workers and/or outsiders, in a similar manner about 82 percent reported migration outside the study area were not influenced by the taungya system. This is linked to the fact that benefits from taungya system to the community would lead to creation of employment and income both directly and indirectly. The result is in contrast to Cramer and Pontara (1998), as identified in their study that the rural residents are very traditional with concerns that outsiders and migrate workers may disrupt their customs such as; religious traditions, community leadership structure, marriage and family customs, and circumcision rituals.

Increased Social activities

About 51 percent claimed that social activities in the study area were not influenced, this was followed by assertions by the community member that the taungya system has less influence by 28.09 percent with respect to the social activities in the community whereas others claimed that the social activities in the study area has been influenced by 9.74 percent. Some of the social activities include beer parlour joints, religious centres, football watching centres etc.

Social amenities

The result indicated that the taungya system has no positive effect in creation or development of social amenities by 59.93 percent, this was followed by 21.35 percent claims that the taungya system has less effect on the social amenities in the

General Community activities

The result of the socio-economic impact of taungya system on the general activities and yield in the study area is given in table 6 and 7. There is concern that the introduction of taungya system and willingness of the community members to participate will result to improvement in the general activities in the study area.

study area. This may be linked with the bad roads and epileptic power supply in and around the study area. It is however not out of place to see assertions that the social amenities in the study area have been affected by 4.87 percent with 1.12 percent claims of a very high effect of the taungya system on social amenities in the study area.

Increased Community Participation in Afforestation Programmes

The finding shows that there is need to re-access efforts to regenerate or afforest the reserve, as there is less participation using the taungya system annually. Table 15 shows that, participation in afforestation programme is not affected by the taungya system. About 51.98 and 17.98 percent of the respondents affirmed that participation in afforestation programme is not influenced and less influenced respectively in a bid to regenerate the forest reserve, while 13.86 and 0.37 percent believed that participation in afforestation programme is influence and highly influenced respectively to obtain fuelwood in agroforestry system. The indication points to the fact that regenerating the forest land using taungya system is a problem in the study area. This finding corroborate with the report made by Adekunle and Yekini (2004) that to make participation in afforestation more effective, government needs to do more than allocate and distribute seedlings, leaving the farmers to do the pre-planting and planting operations.

Reporting Forest Encroachers

The increase encroachment of the forest in the study area by farmers for agricultural purpose is a direct interpretation that

most farmers in the study area are predominantly small farm holders, a consequence of shortage of land for agriculture. As shown in table 15, the findings indicated that the rate at which encroachers are reported is low as 96.63 percent claimed such acts are not being reported. However, 3 percent asserted that the taungya system has had less influence on reporting forest encroachers.

Impact of Taungya System on Yield

The result of the socio-economic impact of taungya system on yield is given in table 7 below. The observation revealed that majority of the farmers in the study area gain from the

Table 7: Socio-economic impact of taungya system on yield

Yield Effect of Taungya Farming	Frequency	Percentage
Increased	81	60.45
Decreased	39	29.10
No Effect	14	10.45
Total	134	100

Source: Field Survey, 2014.

CONCLUSION AND RECOMMENDATIONS

The results showed that household's decision to participate in taungya farming system is positively and significantly influenced by an increase in the farm size of the household head, the income level of the household head, farming experience, size of the household, as well as gender of household head. The regression analysis showed that the wealth status of the household has a predictive power in determining their decision to participate in taungya system. This finding is line to logical expectations in the sense that better-off households are seen as having control of a high level of resource endowments (e.g. labor and capital) to enable them to establish plantation or managed their farm as compared to poor households or non-taungya farmers who often lack the needed capital.

In general, the significant role of income and yield in farm produce from taungya farming system shows that households can increase their income and also improve their livelihood needs by actively participating in the taungya system. Although taungya farming system alone is not a panacea to alleviate rural poverty, household's decision to adopt such land-use can, undoubtedly, help them cope with emergencies and also prevent them from being pushed further into poverty. The evidence presented above fully support cash income from taungya system increases the overall household's income and enhances their well-being. It is therefore expedient to enhance the economic potential of taungya farming through the adoption of sound management practices. Eventually, this will checkmate destructive effect of forest encroachers when there is no taungya system which is borne out of growing desire for man to meet the desired economic and financial needs for survival (Wombo *et al*, 2008). Thus, it enables values premises to be carefully followed in order to enhance or maximize the inherent economic potential of taungya system.

taungya system. In fact, 6.45 percent of the respondent are of the view that the taungya system increased farmers' yield. However, yield varied among farmers as 29.10 percent claimed that they had reduced yield. This could be due to the closure of the tree crop canopy which deplete the farming space as well as the chances of getting more resources. Thus, it decreases fertility and eventually reduces the ultimate output from the given plot. The resultant effect is reduced yield accruable to the farmers. The result is similar to the views expressed by John (2009); Bernard (2010); Kalu *et al* (2011) that taungya system contributes greatly in increasing or decreasing yield of farmers of rural populace.

5.0 REFERENCES

- Adekunle, V.A.J and Yekini, B. (2004) Rural Livelihood Benefits from Participation in the Taungya Agroforestry System in Ondo State of Nigeria, *Small-scale Forest Economics, Management and Policy*, 3(1): 131-138
- Adesiyani, I.O., Olagunju, F.I. and Salako, B.A. (2007). Comparative study of taungya system and Alley cropping in Ibadam Agricultural zone of Oyo state, Nigerian. *Pakistan Journal of social sciences* Vol 4 no 2. Pp 261-265.
- Akinbile, L.A, Salimonu, K.K, and Yekini, O.T., (2007) Farmer participation in Agroforestry practices in Ondo State, Nigeria. *Res. J. Applied Sci.*, Vol 2. Pp 299-232
- Akitanda, P.C. (1994). Local People Participation in the Management and Utilization of catchment Forest Reserves. A Case Study of Kilimanjaro Catchment Forest reserve, Tanzania. M.Sc. Thesis in the Management of natural Resources and Sustainable Agriculture. Agricultural University of Norway. Pp. 6-20.
- Babalola, F.D. (2009). Joint Forest Management (JFM): opportunity for implementation of rural development in Cross River State, Nigeria. *African Scientist* Vol 10 no 3. Pp 127-137.
- Bada, S.O, (1999). Community Participation in the Management of Omo Forest Reserve. Prepared for FORMECU, Federal Department of Forestry, Abuja, Nigeria, Pp 23-30.
- Ball, J.B (1977) Taungya in Southern Nigeria Project Working Documents FO-NTR/71/546, No. 14, FAO/Fed. Department of forestry, Ibadan, Nigeria. Pp 32.
- Bernard, N, (2010). Contribution of Farm Forest Plantation Management to the Livelihood Strategies of Farm Households in the High Forest Zone of Ghana. Phd Thesis Fakultat fur Forst-, Geo, und

- Hydrowissenschaften, Technische Universität Dresden, Germany. Pp 20-30
- Cramer, C. and Pontara, N. (1998). Rural poverty and poverty alleviation in Mozambique: What's missing from the debate? *The Journal of Modern African Studies*, 36:101-138.
- FORMECU, (1999). Forest Resources Study, Nigeria. Revised National Report Vol. 2. Prepared for FORMECU by Beak and Geomatics International, Pp 87-99.
- Idusuyi, I. (1997). Studies on Agroforestry practices: Adoption and Economic importance in Edo State. B.Sc Thesis, Department of Forestry and Wildlife, University of Benin, Benin City. Pp77.
- Jennifer L. (2009). Analysis of the potential socio-economic impact of establishing plantation forestry on rural communities in Sanga District, Niassa province, Mozambique. M.Sc Thesis Forestry and Wood Science Department, Stellenbosch University. Pp 25-28.
- John K.A. (2009). Utilising a Taungya Plantations Programme to Reduce the Poverty of farmers in Ashanti region: A case study of Asuboi and Kunsu dotiem Farming communities. M.phil Thesis Department of Sociology and Anthropology of the Faculty of Social Sciences, University of Cape Coast. Pp. 73-78.
- Kalu, C., Oboho, E. G. and Ihama, O.E. (2011). Economic Potential of Taungya Farming System in Edo State, Nigeria. *Journal of Agriculture and Social Research (JASR)* Vol. 11, No. 1. Pp 51-54.
- Kaosa-ard, A. (1996). Teak (*Tectona grandis* Linn. f.). Domestication and Breeding. UNDP/FAO, Los Baños, Phillipines. RAS/91/004.
- Keogh, R. 1996: Teak (2000). Amazona Teak Foundation. Amsterdam. Nederlands. Kjær, E.D. and G.S. Foster (1996): The economics of tree improvement of teak. Technical Note 43. Danida Forest Seed Centre. Humlebæk. Denmark.
- Nair, P.K.R. (1993) An introduction to Agroforestry. Kluwer Academic publishers in cooperation with ICRAF. 499.
- Ogunlade, A.B. (1993), 'The needed strategies and problems of Industrial Plantation Development in Nigeria', in E.A. Oduwaye (ed.), *Proceedings of 23rd Annual Conference of the Forestry Association of Nigeria*, 29 November-3 December 1993, Lagos, Nigeria.
- Okafor, J.C. (1994) Forest Management for Sustainable Timber Production, the Nigerian experience. A paper presented at the workshop forest land use options. Conflict and solution 24th – 28th January 1994, Kumasi Ghana, 51-62.
- Oke, D.O. (2002), 'Planted tree fallow: A sustainable option for improved rural livelihood. In: J.E. Abu, P.I. Oni and L. Popoola (eds), *Proceedings of 28th Annual Conference of the Forestry Association of Nigeria*, 4 –8 November 2002, Akure, Nigeria.
- Popoola, L. (1998) Economics of diversified food production on wetlands. Paper presented at the Ecoregional program on Humid Tropical Africa region (EPHTA) scientific workshop, IITA Ibadan, Nigeria 17-20 November, 1998 26.
- Wombo, T. A. Dagba, B. I. and Dara, B. A. (2008) Green House Gas Emission and Agroforestry, In: L. Popoola (ed), *Proc. Of 3rd Annual Conf. of FAN*, held in Umuahia, Abia state